STARTLING STATEMENTS ABOUT FERTILIZERS.

An Agricultural Department Bulletin Contradicts Some Popular Theories About Plant Foods.

A week or two ago The Progressive Farmer received the following statement from the Department of Agriculture at Washington:

"CHEMISTRY OF SOILS AS RELATED TO THE YIELD OF CROPS

"The Secretary of Agriculture announces that the Bureau of Soils has just finished an exhaustive investigation of the chemistry of soils as related to the yield of crops. The results indicate that practically all soils have sufficient available plant food for normal crop yields, and that this supply is constantly maintained through natural agencies in the soils dissolving the material of the soil grains. The difference in yield is dependent upon the condition and kind of cultivation and rotation of crops, maintaining certain necessary physical conditions in the soil, under which this plant food can be used by the crop. A bulletin has just gone to press giving the details of the investigation, and discussing the influence or climate, texture of soils, rotation, fertilizers, and soil management upon the yield of crops. The work is based upon analyses by new and exceedingly sensitive methods, by which the amount of plant food in the soil moisture itself, which is the great nurative solution for the support of crops, has been determined, and not by digesting the soils in acids which attack the inert mineral matter of the soils.

"While the conclusions appear to be in conflict with the opinions held for so many years by agricultural chemists, they are in strict conformity with the experience of good farmers in all countries, and with actual facts which have long been established by agricultural chemists. The fertility of the soils is thus shown to be due to physical causes which control the supply of water and plant food which it contains, as the soil moisture in all cases appears to be about the same in composition and concentration. The fertility is therefore controlled by a physical cause, and a chemical examination of a soil can not be expected to indicate the yield of a crop. It is believed that a simple physical method will be devised for determining the relative fertility of soils."

Our Washington correspondent also alluded to this matter in his letter in last week's paper, and the bulletin itself, which has since come to hand, bears out all that has been said regarding the novelty of its ideas and the far-reaching effects of its conclusions. Southern readers will probably be most interested in the discussion regarding fertilizers, and the more notable paragraphs on this subject are given in full herewith:

THE ROLE OF COMMERCIAL FERTILIZERS.

"If the generalizations contained in this bulletin, to the effect that the soil moisture has sensibly the same composition in different types of soil and in soil under good and poor methods of cultivation, and that there is more of these fertilizing ingredients in all the soils reported in the foregoing tables than the plant actually needs be sustained, it may be that the role of fertilizers require other explanations than those now generally accepted.

"There is no question that in certain cases, and in many cases, the application of commercial fertilizers is beneficial to the crop. The experience of farmers, the enormous sums expended for commercial fertilizers, and the many experiments carried on at the experiment stations prove that under certain conditions fertilizers are very beneficial in increasing the yields of crops. The fundamental idea under all of this work, however, has been that of supplying plant food in an available form; that is, adding to the supply existing in the soil. It is significant that other conditions of growth have so much influence on the yield that in but very few instances, even after long continued experiment, has it been demonstrated that any particular fertilizing ingredient or ingredients are required for any particular soil, and that even then the effect of the fertilizer varies so greatly from year to year that no specific law has been worked out, even for a particular soil, from which the fertilizing requirements could be deducted in any exact manner.

"It is also significant that, in general farming, fertilizers are most useful in the early stages of the growth of plants, and the common practice is either to put the fertilizer in with the plant or to put it in at some time before the seed is planted. Very little effect is obtained in field culture in attempts to increase the value of a crop showing signs of inferior growth, by the application of fertilizers. This would indicate that the effect is early and immediate. In opposition to this may be cited the special cases of the application of nitrates to increase leaf development, potash salts to increase starch, and many similar cases, particularly in green-house culture, to hasten the maturity, to prolong the growth, or to produce artificial stimulation of certain plant processes. But the use of fertilizers in such cases is recognized as producing artifical and abnormal conditions

NO PERMANENT STANDARD FOR FERTILIZING.

"In the co-operative experiments carried on by Atwater, numerous cases are cited where phosphoric acid is said to be a regulating ingredient and the predominating factor in controlling crop yields one year, while it is more or less efficient in the same soil in other years, and is inefficient in many cases in the same soils in still other years. The same fact is brought out in regard to potash and nitrogen, and it is clearly and unquestionably demonstrated that the effect of fertilizers is dependent upon the season, it being so influential in one season as to be designated as a dominant factor in the yield of the crop, while on the same soil in a different season it has no apparent effect. It is not that the effect is one year greater and the next year less, which might be attributed to the previous application, but it is just as likely to be inefficient one year and the controlling factor the next year as it is to be a controlling factor one year and inefficient the succeeding year.

PROPER CULTIVATION MORE IMPORTANT THAN FERTILIZERS.

"One possible explanation of the effect of fertilizers, which would be in entire accord with the hypothesis that has been formulated, is that the fertilizer is needed during the early period of growth when the root system is beginning to develop, that is, as the plant germinates and begins to feed upon the soil the root system has to be artifically nourished by a temporary increase in concentration as regards one or more constituents, whereas, when the root system is developed into a considerable volume of soil the plant will be quite capable of collecting all of these materials it may require. It is a fact, admitting of no argument, that fertilizers rarely take the place of efficient methods of cultivation and of cropping in increasing or maintaining crop yields. With the present methods of cultivation, the difference between the yield of eight bushels of wheat per acre on the Cecil clay in North Carolina and twenty-five to thirty bushels per acre on the same soil in Maryland can not be adjusted by the application of any kind or any amount of fertilizers to the North Carolina soil. Some instances occur, however, where under more perfect methods of cultivation and cropping twenty-five bushels of wheat have been obtained year after year on the North Carolina soil, but this involved fundamental changes in the physical character and condition of the soil which would be amply sufficient to explain the difference in yield.

RATIO OF PLANT FOODS A MINOR CONSIDERATION.

"The idea now held by the Bureau as a result of these investigations is that the ratio of the nutrient elements in normal soils does not play a very important part in the yield of crops, or, to be more explicit, low yields are usually related to the physical conditions and characteristics of the soil, and that it is only after these major controlling factors are changed and the yields thereby increased, that it would be necessary or profitable to consider this question of the ratio of plant foods. In other words, that it is only where all other conditions of plant nutrition and growth are satisfactorily controlled that the nutritive ratio can be considered an important factor and that the influence of this would be mainly seen in the quality of the crop rather than in the yield. In this effect it is analogous to the feeding of animals for work, fat, flesh, speed, or endurance, all of which can be sensibly controlled by the nutritive ratio only if other more important factors of growth and development, such as environment, etc., have been given due consideration. From our field investigations it does not appear that the low yield of five to eight bushels to the acre on the Cecil clay of North Carolina, as compared with the twenty-five to thirty bushels of wheat obtained from the same soil under better methods of cultivation, can be due to a defective nutritive ratio in the first case, and that, therefore, this can not be in general an important cause of low crop yields, and that the subject of nutritive ratio can, therefore, safely be put aside for the present as of relatively little importance to the farmer, however great its importance may be to the horticulturist and floriculturist under the intensive system of cultivation practiced in those special lines.

"THE CONTROLLING FACTOR IN YIELD IS NOT THE AMOUNT OF PLANT FOOD"

"The exhaustive investigation of many types of soil by very accurate methods of analysis, under many conditions of cultivation and cropping, in areas yielding large crops and in adjoining areas yielding small crops, has shown that there is no obvious relation between the amount of the several nutritive elements in the soil and the yield of crops; that is to say, that no essential chemical difference has been found between the solution produced in a soil yielding a large crop of wheat and that in a soil of the same character in adjoining fields giving much smaller yields. The conclusion logically follows that on the average farm the great controlling factor in the yield of crops is not the amount of plant food in the soil, but is a physical factor the exact nature of which is yet to be determined."

Farmers Storing Their Cotton.

All of the cotton brought into the city yesterday was not sold. There are two or three bonded warehouses here, where cotton may be stored, with insurance, for about 15 cents a bale per month. A large number of farmers have been taking advantage of these warehouses for the past few years, and have held their cotton for better prices. Some of the farmers who had cotton yesterday, when they learned that the staple had fallen to 9 cents, stored what they had.—Charlotte Observer.

Waxhaw Enterprise: Perhaps the first corn harvester ever in use in this section has been at work in the fields around town this week. It is a fine piece of mechanism and harvests the corn as though it had a certain degree of intelligence of its own. It cuts the corn and ties it in bundles and bunches it like a reaper does wheat. It is drawn by two mules and harvests several acres of corn in aday. The machine is the property of Mr. H. F. Bivens. The corn harvester is a great feed saver, especially if its work is followed later by that of a shredder.